MULTIMEDIA UNIVERSITY

FINAL EXAMINATION

TRIMESTER 3 2016/2017

TSE2101/TCS2411 – SOFTWARE ENGINEERING FUNDAMENTALS

(All Sections/Groups)

29 MAY 2017
09:00 AM – 11:00 AM
(2 Hours)

INSTRUCTIONS TO STUDENTS

1. The total number of pages for this examination paper is thirteen(13) pages including the cover page.

2. This examination paper contains a total of six(6) questions divided into two(2) different sections, Section A and Section B, respectively. Each section contains three(3) questions.

3. You are required to answer a total of four(4) questions. You must answer any two(2) questions from Section A, and any two(2) questions from Section B.

4. Each question carries an equal score of 25 points. The total score for this examination paper is 100 points.

SECTION A
(Answer any two(2) questions in this section)

QUESTION A1

A1(a) Elaborate on the following facts about software. You may provide examples in your answers to explain the meaning or implication of each statement.

(a1) Software are predefined instructions for a computer.

(a2) Software does not wear out, is perfect and will never degrade.

(a3) Software are ideas turned into directives that control a computer.

(a4) Some systems do not require software. These systems worked perfectly.

(a5) Software engineering is not practiced on small software projects.

[5 x 2 points = 10 points]

A1(b) Answer the following questions. You may provide examples in your answers.

(b1) Why is the Waterfall Process Model considered prescriptive?

(b2) Describe how we can turn the Spiral Process Model to become prescriptive.

(b3) Why is it a bad thing when errors in the Waterfall Process Model are only discovered when it reaches the software testing stage?

(b4) Explain what it means when we say, *"The Waterfall Process Model avoids overlapping of phases"*.

(b5) *The Incremental Process Model may be conducted in a linear and parallel manner.* Discuss this statement.

[5 x 2 points = 10 points]

Continue ...

A1(c) Answer the following questions regarding the Figure: Question A1(c) below.

(c1) Suggest an appropriate and accurate title or caption for the figure below to replace the words *"Figure: Question A1(c)"*

[2 points]

(c2) Describe briefly (*in less than 100 words*) what the figure below represents (*or is trying to say to you*).
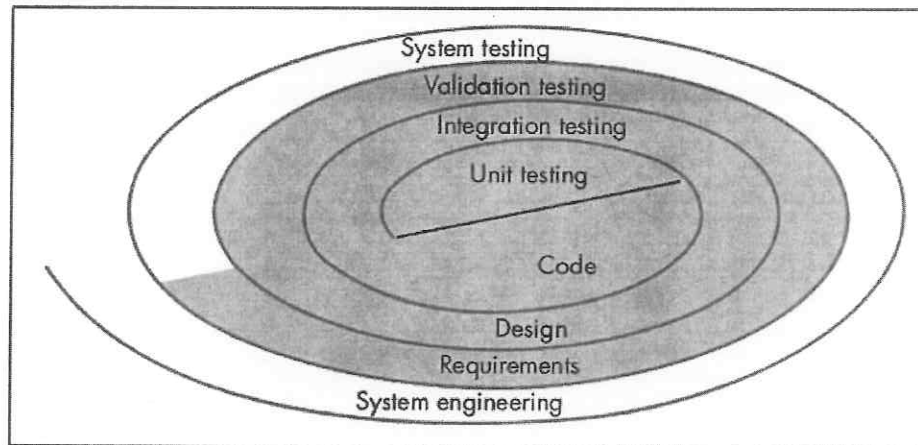
[3 points]

Figure: Question A1(c)

[Total points = 25 points]

Continue ...

QUESTION A2

A2(a) Describe the meaning of the following terms used in the context of software engineering. You may provide examples in your answers.

      (a1) a process framework
      (a2) a milestone
      (a3) a deliverable
      (a4) a checkpoint
      (a5) an umbrella activity

[5 x 2 points = 10 points]

A2(b) Answer the following questions. You may provide examples in your answers.

(b1) Briefly explain how the data initialization problem arise in structured design.

(b2) Briefly describe the data ownership problem object-oriented design solves.

(b3) *Structured programming cannot be all things bad.* Provide two(2) advantages of structured programming.

(b4) *Object-oriented design cannot be all about good solutions.* Provide two(2) disadvantages of object-oriented design.

(b5) In what way does encapsulation help overcome the weakness in structured design?

[5 x 2 points = 10 points]

Continue ...

A2(c) Answer the following questions regarding the Figure: Question A2(c) below.

(c1) Suggest an appropriate and accurate title or caption for the figure below to replace the words *"Figure: Question A2(c)"*

[2 points]

(c2) Describe briefly (*in less than 100 words*) what the figure below represents (*or is trying to say to you*).
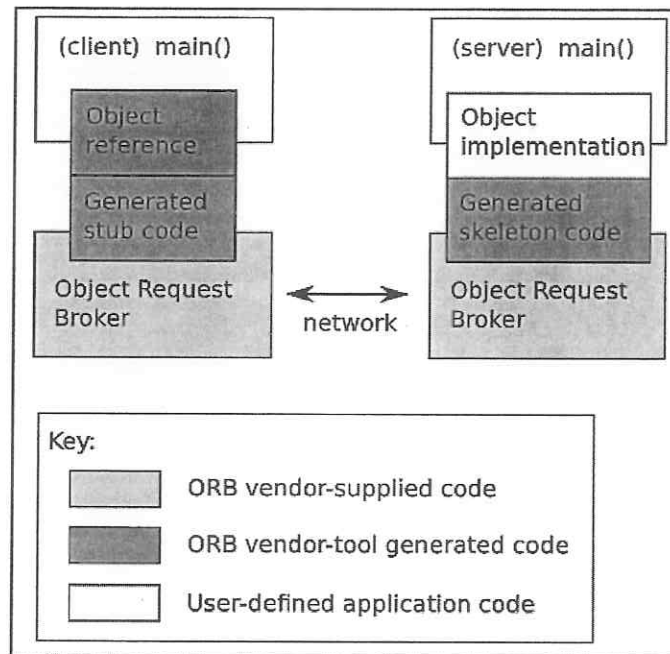
[3 points]

Figure: Question A2(c)

[Total points = 25 points]

Continue ...

QUESTION A3

A3(a) Elaborate on the following activities conducted in software engineering project management. For each activity, provide one(1) specific example of a task.

      (a1) Plan
      (a2) Review
      (a3) Monitor
      (a4) Control
      (a5) Coordinate

[5 x 2 points = 10points]

A3(b) Answer the following questions. You may provide examples in your answers.

(b1) What does the word asynchronous in AJAX framework mean?

(b2) Provide two(2) benefits Cascading Style Sheets (CSS) bring into software web development.

(b3) Explain two(2) common methods for interfacing codes with components built using different programming languages.

(b4) Discuss two(2) issues of concern in strictly following instructions of the vendor for hardware interfaces.

(b5) Why do we need transaction servers? Give two(2) examples of popular transaction servers.

[5 x 2 points = 10 points]

Continue ...

A3(c) Answer the following questions regarding the Figure: Question A3(c) below.

(c1) The figure below is an excerpt of an important document in software engineering. Suggest an appropriate and accurate title or caption for the figure below to replace the words *"Figure: Question A3(c)"*

[2 points]

(c2) Describe what validate and verify in requirement statement number 6.2.3 in Figure Question A3(c) below means.

[3 points]

6.2 Vehicle Location Data Validation

6.2.1 The SBB of the vehicle shall transmit raw data to SVT database at specified intervals. The scope of work for providing the data into the SVT database is on a separate contract provided by a separate vendor. The SVT system begins its process from this raw data. The regularity of receiving raw data is a variable that can be set in the SBB.

6.2.2 The raw data record structure provided to the SVT database from the SBB transmission is as follows:

- SBB ID: varchar(10)
- Vehicle registration: varchar(10)
- Data date: date
- Data time: time with time zone
- Latitude: double
- Longitude: double
- SBB Message: varchar(50)

6.2.3 The SVT system must validate and verify that each raw data record received comply with the data structure in Item 6.2.2 above. In the event that any field data does not comply, the entire record shall be considered corrupt.

6.2.4 A separate register of all corrupted records must be maintained in the system. This register will be used to track "faulty SBB" or "bad communications" between the SBB and the SVT database.

6.2.5 A suitable test data set must be prepared for the raw data for the SVT system. It must be as real as possible to the operational case of the SVT system. The test data set must provide both static and dynamic vehicle location data covering all the fields as

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Figure: Question A3(c)

[Total points = 25 points]

Continue ...

SECTION B
(Answer any two(2) questions in this section)

QUESTION B1

B1(a) Answer the following questions regarding issues in software modeling and software engineering management practice. You may provide examples in your answers.

(a1) What is the reason for the advice, *"Do not become dogmatic about the syntax of the model"*?

(a2) What does the instruction, *"The behavior of software as a consequence of external events must be represented"* mean?

(a3) Why must the design models be developed iteratively?

(a4) Provide two(2) reasons why planning is the hardest part in SWE practice?

(a5) Provide one(1) specific example of a situation where negotiation is required in the conduct of requirements gathering.

[5 x 2 points = 10 points]

B1(b) Answer the following questions. You may provide examples in your answers.

(b1) Briefly describe two(2) characteristics of standardized software components according to the SICDD principle.

(b2) Provide two(2) examples of standardized software component models in Component Based Software Engineering (CBSE).

(b3) Describe the focus of creational and structural design patterns.

(b4) *The accordion design pattern is one of the many structural design patterns provided under the Yahoo Design Pattern Library.* Explain what the accordion design pattern solves.

(b5) What can you say about a library, a framework, and an API in terms of their perspectives toward a fully functional software application?

[5 x 2 points = 10 points]

Continue ...

B1(c) Answer the following questions regarding the Figure: Question B1(c) below.

    (c1) The figure below is an excerpt of an important document in software engineering. Suggest an appropriate and accurate title or caption for the figure below to replace the words *"Figure: Question B1(c)"*

[2 points]

    (c2) Describe the "Ship Goods" process in Figure: Question B1(c) below. You must explain the incoming arrows and the outgoing arrows for this process.
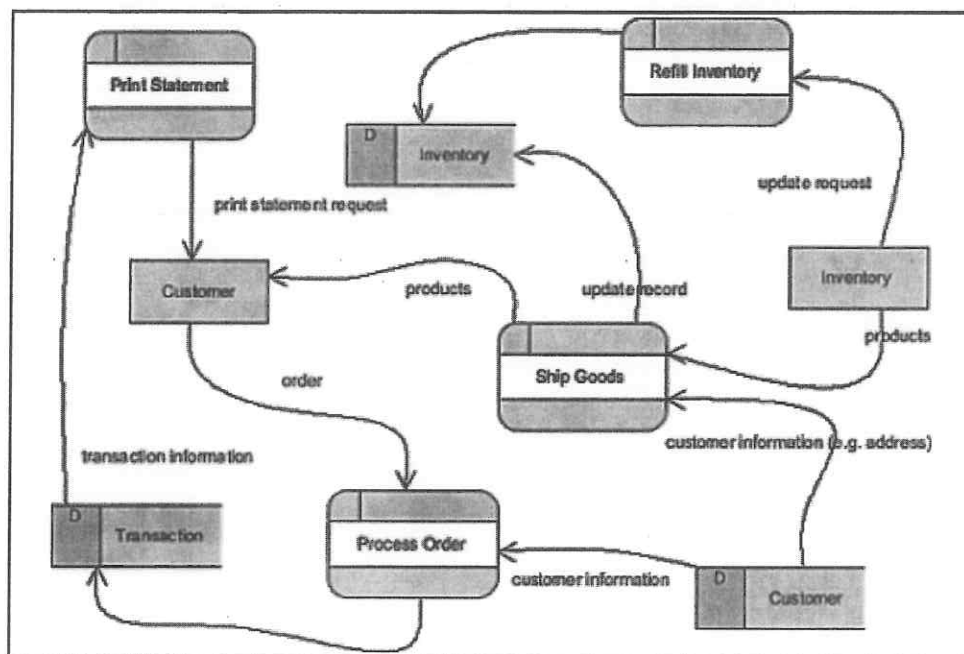
[3 points]

Figure: Question B1(c)

[Total points = 25 points]

Continue ….

QUESTION B2

B2(a) Answer the following questions. You may provide examples in your answers.

(a1) Provide two(2) reasons on the importance of requirements to be documented

(a2) List two(2) steps we must conduct in requirements gathering.

(a3) Describe two(2) differences between a web and a desktop application.

(a4) Describe two(2) steps in the preparation of test cases.

(a5) What is concurrency or time parallelism in software design?

[5 x 2 points = 10 points]

B2(b) Answer the following questions. You may provide examples in your answers.

(b1) What does software quality measure in software product and software manufacturing process?

(b2) *A software quality factor is not software quality.* Explain this statement.

(b3) *Complexity and maintainability are two(2) software quality factors that cannot be easily measured.* Discuss this statement.

(b4) Describe two(2) major differences between the ISO 9001 Quality Standard and the Capability Maturity Model Integration (CMMI) for software quality.

(b5) What are the two(2) quality aspects of ISO-9000 Quality Standards?

[5 x 2 points = 10 points]

Continue ...

B2(c) Answer the following questions regarding the Figure: Question B2(c) below.

(c1) Suggest an appropriate and accurate title or caption for the figure below to replace the words *"Figure: Question B2(c)"*

[2 points]

(c2) Describe briefly (in less than 100 words) what the figure below represents. Hint: *What software engineering concept is the figure trying to tell you? Study carefully each label in each block diagram in the figure.*
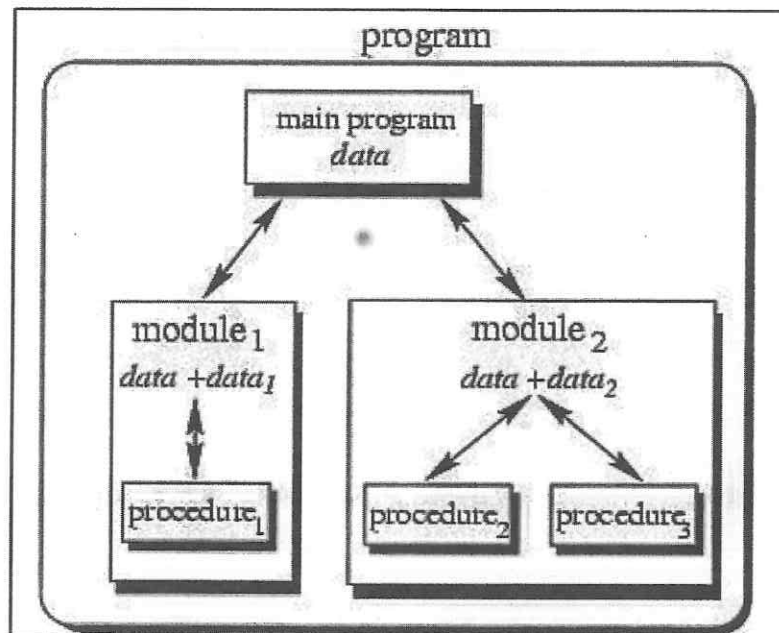
[3 points]

Figure: Question B2(c)

[Total points = 25 points]

Continue ...

QUESTION B3

B3(a) Answer the following questions. You may provide examples in your answers.

(a1) Provide two(2) contributions of Computer-Aided Software Engineering (CASE) tools in software design and software construction.

(a2) *Re-engineering of software is about rebuilding and making the software better.* Describe two(2) principles in rebuilding software.

(a3) Describe two(2) kinds of information a configuration management CASE tool address.

(a4) Describe the main difference between re-engineering and reverse engineering for software.

(a5) List two(2) benefits of reverse engineering.

[5 x 2 points = 10 points]

B3(b) Answer the following questions. You may provide examples in your answers.

(b1) Describe the purpose of Software Configuration Management (SCM).

(b2) What is a software baseline? How is the baseline used?

(b3) How do software production houses use SCM to support their different customers?

(b4) Describe two(2) types of software maintenance in terms of their focus according to the (CAPP) principle.

(b5) *Quality code is very hard to measure, but it is not impossible.* List two(2) examples of metrics for static software code quality.

[5 x 2 points = 10 points]

Continue ...

B3(c) Answer the following questions regarding the Figure: Question B3(c) below.

(c1) Suggest an appropriate and accurate title or caption for the figure below to replace the words *"Figure: Question B3(c)"*

[2 points]

(c2) Provide three(3) specific examples of software configuration items (SCIs) as shown in Figure: Question B3(c) below. You are required to name the three(3) different items in your examples. *(Specific means not generic.)*
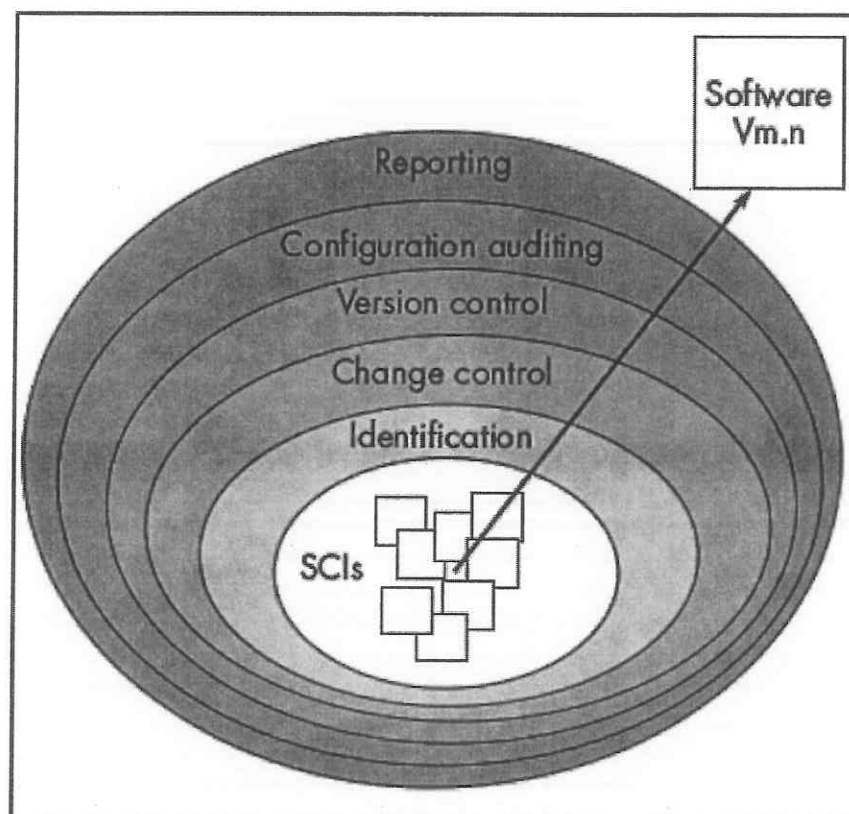
[3 points]

Figure: Question B3(c)

[Total points = 25 points]

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